Amendments to the Claims:

Claims 1 and 14 have been amended. Claims 2 and 15 are previously presented. Claims 3-8 and claims 9-13 are original. Claims 16-18 are new. No new matter is introduced by these amendments.

Listing of Claims:

Claim 1 (currently amended): A multi-stage delay clock generator comprising:

a plurality of delay cells, each delay cell generating a delay signal to a subsequent delay cell in response to a delayed clock signal from a preceding delay cell and a delay control signal where a first delay cell among the plurality of delay cells receives an external clock signal, wherein each delay cell is divided into a plurality of delay steps and each subsequent delay cell comprises a smaller delay step than the current delay cell;

a phase detector, responsive to the external clock signal and a feedback clock signal, for generating a lock control signal; and

a control unit, responsive to the lock control signal, for generating the delay control signal for programming the delay cells.

Claim 2 (previously presented): The multi-stage delay clock generator in claim 1, wherein the control unit comprises:

a delay counter, responsive to the lock control signal, for generating the delay control signal;

a plurality of multiplexers, responsive to the delay control signal, for outputting a select signal; and

a plurality of latches, responsive to the select signal, for outputting a lock signal to the plurality of delay cells and to a subsequent multiplexer.

Claim 3 (original): The multi-stage delay clock generator in claim 1, wherein a range of the first delay cell is greater than a range of a maximum delay target from the external clock signal.

Claim 4 (original): The multi-stage delay clock generator in claim 1, wherein the delay step of a last delay cell is smaller than a system jitter.

Claim 5 (original): The multi-stage delay clock generator in claim 1, wherein a delay step of the first delay cell is determined by a total number of programming bits.

Claim 6 (original): The multi-stage delay clock generator in claim 5, wherein the total number of programming bits is a value from dividing the range of the maximum delay target by the delay step of the first delay cell.

Claim 7 (original): The multi-stage delay clock generator in claim 1, wherein a number of delay cells is dependent on a resolution of the last delay cell.

Claim 8 (original): The multi-stage delay clock generator in claim 1 further comprises a delay offset electrically coupled to a last delay cell for generating an offset delay signal.

Claim 9 (original): A method for generating a delay signal comprising:

comparing an external clock signal and a feedback to determine a maximum delay target;

dividing a first delay cell into a plurality of delay steps according to a number of programming bits that is obtained from the maximum delay target;

repeatedly dividing a subsequent delay cell into a plurality of smaller delay steps according to a size of the delay steps of the first delay cell, wherein each

subsequent delay cell comprises smaller and smaller delay steps;

comparing the external clock signal to the delay step of the delay cells by a tunable detecting window to output a lock control signal;

latching the delay cell according to the lock control signal;

adjusting a width of the tunable detecting window for the subsequent delay cells; and

sending a delay control signal to the delay cells.

Claim 10 (original): The method of claim 9 further comprises initially programming the delay cells.

Claim 11 (original): The method of claim 10, wherein initially programming the delay cells comprises:

asserting a reset signal to the first delay cell;

calibrating the first delay cell;

latching a delay value of the first delay cell; and

asserting the reset signal to the subsequent delay cell until all delay cells are calibrated.

Claim 12 (original): The method of claim 9, wherein a delay step of the first delay cell is determined by a total number of programming bits.

Claim 13 (original): The method of claim 9 further comprises a delay offset electrically coupled to a last delay cell for generating an offset delay signal used for preventing a trap causing lock-failure.

Claim 14 (currently amended): A multi-stage delay clock generator for generating a delay signal, comprising:

a first delay chain for generating a first delay signal, in response to an external clock signal and a first delay control signal, comprising a plurality of delay cells, each delay cell generating a delayed clock signal from a preceding delay cell and a delay control signal, wherein each delay cell can be divided into a plurality of delay steps and each subsequent delay cell comprises a smaller delay step than the current delay cell;

a second delay chain for generating a second delay signal, in response to a second delay control signal and a feedback clock signal, comprising a plurality of delay cells, each delay cell generating a delayed clock signal to a subsequent delay cell in response to a delayed clock signal from a preceding delay cell and a delay control signal, wherein each delay cell can be divided into a plurality of delay steps and each subsequent delay cell comprises a smaller delay step than the current delay cell;

a first phase detector, responsive to a delayed external clock signal and the first delay signal, for generating a first control signal;

a second phase detector, responsive to a delayed feedback clock signal and the second delay signal, for generating a second control signal; and

a control unit, responsive to the first and the second control signal, for generating the first delay control signal and the second delay control signal for programming the delay cells.

Claim 15 (previously presented): The multi-stage delay clock generator in claim 14, wherein the control unit comprises:

a delay counter, responsive to the lock control signal, for generating the delay control signal;

a plurality of multiplexers, responsive to the delay control signal, for outputting a select signal; and

a plurality of latches, responsive to the select signal, for outputting a lock signal to

the plurality of delay cells and to a subsequent multiplexer.

Claim 16 (new): A multi-stage delay clock generator comprising:

a plurality of delay cells, each delay cell generating a delay signal to a subsequent delay cell in response to a delayed clock signal from a preceding delay cell and a delay control signal where a first delay cell among the plurality of delay cells receives an external clock signal, wherein each subsequent delay cell comprises a smaller delay step than the current delay cell;

a phase detector, responsive to the external clock signal and a feedback clock signal, for generating a lock control signal; and

a control unit, comprising:

a delay counter, responsive to the lock control signal, for generating a delay control signal;

a plurality of multiplexers, responsive to the delay control signal, for outputting a select signal; and

a plurality of latches, responsive to the select signal, for outputting a lock signal to the plurality of delay cells and to a subsequent multiplexer.

Claim 17 (new): A multi-stage delay clock generator comprising:

a plurality of delay cells, each delay cell generating a delay signal to a subsequent delay cell in response to a delayed clock signal from a preceding delay cell and a delay control signal where a first delay cell among the plurality of delay cells receives an external clock signal, wherein each subsequent delay cell comprises a smaller delay step than the current delay cell;

a phase detector, responsive to the external clock signal and a feedback clock signal, for generating a lock control signal;

a control unit, responsive to the lock control signal, for generating the delay control signal for programming the delay cells; and

a delay offset electrically coupled to a last delay cell for generating an offset delay signal.

Claim 18 (new): A multi-stage delay clock generator for generating a delay signal, comprising:

a first delay chain for generating a first delay signal, in response to an external clock signal and a first delay control signal, comprising a plurality of delay cells, each delay cell generating a delayed clock signal from a preceding delay cell and a delay control signal, wherein each subsequent delay cell comprises a smaller delay step than the current delay cell;

a second delay chain for generating a second delay signal, in response to a second delay control signal and a feedback clock signal, comprising a plurality of delay cells, each delay cell generating a delayed clock signal to a subsequent delay cell in response to a delayed clock signal from a preceding delay cell and a delay control signal, wherein each subsequent delay cell comprises a smaller delay step than the current delay cell;

a first phase detector, responsive to a delayed external clock signal and the first delay signal, for generating a first control signal;

a second phase detector, responsive to a delayed feedback clock signal and the second delay signal, for generating a second control signal; and

a control unit comprising:

a delay counter, responsive to the lock control signal, for generating the delay control signal;

a plurality of multiplexers, responsive to the delay control signal, for outputting a select signal; and

a plurality of latches, responsive to the select signal, for outputting a lock signal to the plurality of delay cells and to a subsequent multiplexer.